

CHATHAM PETREL (*Pterodroma axillaris*) — AN OVERVIEW

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ABSTRACT

Records of Chatham Petrel (*Pterodroma axillaris*) up to 1989 are reviewed. A research programme that started in the breeding season of 1989/1990 to locate more individuals and more active burrows is described. Several methods of locating birds were employed and status of all burrows, and breeding success and measurements of all birds were recorded. The population at the end of the 1991/1992 breeding season is estimated. Conservation issues presented by the species are discussed.

INTRODUCTION

Very little has been published on the Chatham Petrel (*Pterodroma axillaris*) since Hawkins, a commercial collector, discovered it on South East Island in 1892. It was described a year later as *Oestrelata axillaris* (Salvin 1893a), repeated shortly after in Salvin (1893b), in time for Forbes (1893) to include it in his list of Chatham Island birds. Godman (1909) published another description and a plate, as did Mathews (1936).

Fleming (1939, 1941) regarded the Chatham Petrel as a race of Cook's Petrel *Pterodroma cookii*; Kinsky (1970) followed Falla (1942) in placing both it and the Black-winged Petrel *Pterodroma nigripennis*, as subspecies of *Pterodroma hypoleuca*, the Bonin Petrel. After the Black-winged Petrel was found breeding on South East Island, Kinsky (1980) elevated both to specific rank. This arrangement was followed by Jouanin & Mougins (1979), Turbott (1990), and Sibley & Monroe (1990).

Until 1938, the only comment on the Chatham Petrel's biology was the story that it had once bred on the south coast of the main Chatham Island (H.G. Blyth, quoted by Archey & Lindsay 1924). This is almost certainly a reference to *Pterodroma magentae*. Oliver (1955) summarised the little information then available, drawing on Fleming's observations made in 1937 (Fleming 1939, 1941).

Research has begun recently into the numbers and biology of the Chatham Petrel, to investigate the reasons for its rarity and as a basis for its future management. This work has so far involved an initial survey of the petrels of South East Island (West & Nilsson 1994), and efforts to locate the remaining breeding birds. It is timely to summarise previous sightings and other records of the Chatham Petrel at this stage of the programme, to provide a background for future research. The information presented here has been collected from personal accounts, published records, and from data gathered by the author and others in the southern summers of 1986, 1989, 1990, and 1991.

REVIEW OF RECORDS BEFORE 1989

C.A. Fleming visited the Chatham Islands ($44^{\circ}20' \text{ S } 176^{\circ}10' \text{ W}$) from 28 November 1937 to 24 January 1938 (Fleming 1939); for part of this time he was accompanied by E.G. Turbott. They camped on South East Island for 15 days (December 16-31 1937). Fleming (1939) described the island, which had not been visited by an ornithologist since the collector Hawkins was there in the 1890s, as consisting of "bracken 'clears' and pasture-land alternating with beautiful park-like bushlands". There were 500-600 sheep on the island. Of the Chatham Petrel he noted that the party found "fairly numerous freshly killed and mauled specimens in skua middens, particularly on the north-east coast", and saw five adults on the ground. Two of these birds were associated with a burrow which was described as "long and deviating"; one petrel was observed in torchlight as it flew in to its burrow. He found the burrows cleaned out and lined ready for laying but no eggs were present (Fleming 1941). He observed none at sea.

Indeed, the species has rarely been recorded away from South East Island (Falla *et al.* 1979). One was seen 120 km southeast of the Chatham group on 27 November 1970 at $45^{\circ}07' \text{ S}, 176^{\circ}30' \text{ W}$ (Rogers 1980). Three individuals have been attracted to spotlights at the Tuku Nature Reserve observation area by workers studying Chatham Island Taiko (*P. magentae*). Two of the three were caught and banded in 1980 and 1992; the third was seen in 1988. In December 1987, two birds were seen at sea near The Pyramid ($44^{\circ}26' \text{ S}, 176^{\circ}14' \text{ W}$) from the yacht *Totorore* (M.J. Imber, pers. comm.).

Apart from the dubious breeding record from Chatham Island noted above, there is evidence that the Chatham Petrel once occurred on other islands in the Chatham group, but it seems never to have been abundant. Despite the collection of large numbers of recent fossil bones of birds from the Chatham Islands (Forbes 1892, P. Millener pers. comm.), only a few bones of *P. axillaris* have been found. Material representing at least three individuals collected from Pitt Island about 1947 is in the Jefferson collection (P. Millener pers. comm.). Fossil bones of both *P. axillaris* and *P. nigripennis* were collected in the 1960s by R. J. Scarlett of the Canterbury Museum and others, both from South East Island and from sand dunes on the Chatham Island itself (Turbott 1990). Some *P. axillaris* remains were found in skua middens on South East Island in 1967 (R. J. Scarlett, pers. comm.). More recently, bones representing four and one individuals respectively were collected from two sites on Mangere Island in the summer of 1987/88 (Tennyson & Millener 1994).

Living birds have proved equally elusive, even on South East Island. In January 1969, D. E. Crockett and party collected a pair from a burrow in Woolshed Bush and saw others in the same area and between the bush and the coast at Whalers Bay. From 1973 to 1976, New Zealand Wildlife Service parties recorded birds in Woolshed Bush. In November 1974, the first Chatham Petrel was banded by a member of one such party.

Between 1977 and 1980, M.J. Imber found four burrows, one corpse, and four live birds, of which he banded three. On 28/2/79, A. Wright (New Zealand Wildlife Service) banded four individuals and collected a fifth. Both birds of a pair were seen near the present hut site on 9/12/80 (T.G.

Lovegrove, pers. comm.). The birds were at a burrow observed by M. J. Imber between 1977 and 1980.

On 27/1/81, an adult was found incubating in a burrow (B. Seddon 1982: Notornis 29: 52). C. M. Miskelly banded seven birds in the 'Top Bush' (two at a burrow, two other pairs, and a single bird) in the summer of 1983/84.

In January and February 1986, M.J. Imber, JW, and others banded 10 birds (two in the first burrow found, a pair on the Summit track, one incubating in the second burrow and five solitary birds, one of which was near the hut).

Before the research programme on the species began in 1989, a total of 28 individuals had been banded. Five of these had been incubating eggs, or associating with incubating birds in three burrows, of which two are still known to exist.

CHATHAM PETREL RESEARCH PROGRAMME 1988-1991

During the breeding seasons of 1988/89, 1989/90, and 1990/91, this species was surveyed to ascertain its status, habitat requirements, breeding dates and numbers with a view to developing a conservation strategy. The survey programme included all burrow-nesting petrels on South East Island (West & Nilsson 1994). No burrows attributable to Chatham Petrels were encountered in the 200 quadrats examined in the first two years (West & Nilsson 1994).

In 1988/89 and 1989/90, areas where individuals had been seen on the ground at night were searched. Night patrols were undertaken in the forest to search for individuals with active burrows and to listen for calling birds which might indicate an aggregation of burrows. Eight burrows containing pairs of birds were found in the first year; two of these contained incubated eggs. Seven of the burrows were at bush edges close to tracks, and in fairly stable substrate about halfway up towards the summit. The eighth was at sea level, in very loose dry soil on a track through *Muehlenbeckia australis* vines and bracken (*Pteridium esculentum*).

Eleven adults were associated with the six new burrows and three further adults were found on the ground away from burrows. In April when the island was visited for a follow-up, the eggs had hatched and two chicks were found and banded. One further adult, in the isolated burrow, was banded. The fourteen birds banded in January and three in April brought the total number banded to 45 birds.

Similar work was undertaken in January 1990. All known burrows were monitored. During day and night searches, one new burrow was located and one extra adult was found on the ground some distance from the known burrows. Laying dates were determined for pairs in five of the eight burrows. These were 2 January for the pair in the lone burrow and from 12 to 17 January for pairs in four other burrows. In April, three chicks were being reared and another adult was found on the ground and banded. This brought the total of identifiable birds to 52. On the night of 1 April 1990, a chick was found on the ground near Rangatira Trig. It was badly infected with ticks and was found dead the next day. It is not known which burrow the chick came from.

Calls of this species had been heard in the past, but none had been recorded. In a further effort to locate potential burrow areas, several nights were devoted to finding, listening for, and recording calling birds. Based on the number of birds seen and calls heard, an area in the upper Kokopu Creek was selected to be systematically searched in the following breeding season.

Recommendations from results of the work in early 1990 were that an area of bracken and vines be cleared to monitor new burrowing attempts, and that other species be removed from the known burrows during the pre-laying period.

During November 1990, an area of about 35 m² near Burrow 8 was cleared of bracken and *Muehlenbeckia* and maintained clear until February 1991. All burrows in the cleared area were mapped and new burrows identified by species. No Chatham Petrels colonized the new area. All known Chatham Petrel burrows were checked at that time and individuals of other species were removed from them.

Surveys (G. Taylor, E. Kennedy, A. Tennyson) resumed on 12/1/91 and continued to 9/2/91. Known burrows were monitored for occupation and dates of laying. Further searches for birds and burrows were conducted in the areas selected the previous year, and other areas where birds had been seen on the ground at night were also searched. The "war-whooping" technique (Warham 1988) was tried and six further burrows were located through its use. In total, 13 new burrows were identified in early 1991; 11 of these held incubating birds. Most of the new burrows were near Kokopu Creek. During this study period, 40 adult birds were captured. These included 10 recaptures of previously banded individuals and 30 new birds. The new birds brought the total number of Chatham Petrels banded to 82.

Although a few burrows were under tall grass or low scrub, most were found under tall, unmodified, ribbonwood (*Plagianthus* sp.) forest. The burrows found most recently were in the valley floor in Kokopu Creek where there was an extremely high density of White-faced Storm Petrel burrows and very few Broad-billed Prion burrows. The size of burrow entrances varied because the friable soil tended to collapse readily. The restriction of burrows to flat or nearly flat terrain may have been caused by the friable soil.

Most *Pterodroma* petrels which breed under forest cover use trees as launching sites for their take-off from the breeding areas. However, some of the smaller petrels can take off from open areas without having to climb trees. For example, Black-winged Petrels on Macauley Island can take off easily from flat ground (G. Taylor, pers. comm.). The earliest marked burrows of Chatham Petrels on South East Island were in areas where there were very few trees large enough to serve as launching sites. The most recently located burrows are under forest canopy which may necessitate the petrels walking to suitable take-off places. Birds breeding under the canopy near Kokopu Creek have not been observed climbing trees, but individuals have been seen on the ground some distance from their known burrows.

The history of observations for each of the 23 burrows monitored from 1989 to 1991 is summarised in Table 1. Laying date is included if known. Outcome of breeding effort is included as determined in March or April

TABLE 1 – History of known Chatham Petrel burrows for years 1989-1991. GS, ground search; WW, war whoop; CB, collapsed burrow; AN, adult on ground at night; BE, burrow encountered by day; CN, chick at night; pr ad, pair of adults; 12.1 etc., date in January.

Burrow No.	Found by	1989		1990		1991	
		Contents	Chick	Contents	Chick	Contents	Chick
1	BE	pr ad		egg 12.1	yes	egg	yes
2	AN	-		-		-	
3	GS	pr ad		egg 14.1		egg	
4	GS	pr ad		-		-	
5	GS	egg	yes	egg 16.1	yes	egg	dead
6	GS	egg	yes	egg 17.1		egg	
7	GS	pr ad		-		-	
8	BE			egg 2.1	yes	egg	
9	GS			pr ad		-	
10	CN		yes(died)				
11	CB					egg	yes
12	CB					egg	
13	WW					egg	
14	GS					egg	
15	WW					egg	
16	WW					egg	
17	WW					egg	
18	WW					egg	
19	AN					ad	
20	WW					egg	
21	GS					egg	
22	GS					egg	
23	GS					ad	

of the same year. In April 1991, only two chicks were found and banded (total banded individuals 84). One burrow contained a small dead chick and another had an unhatched egg in the entrance. One burrow held a dead adult (E. Kennedy, pers. comm.). The 84 birds of this species banded include seven chicks from the three seasons up to 1991. In the 1990/91 survey, 10 of the birds were recaptures and all but one were associated with burrows that year.

By the end of the 1990/91 season it looked as though (from the proportion of recaptures) that the total population was about 200 birds including non-breeders (later work suggests that it is somewhat larger. Given the presumably high survival of adults and the reduction in breeding success, perhaps the population will stay relatively stable unless there is a catastrophic event or the competition from prions is such that the reduction in breeding success reaches a critical level.

MORPHOMETRICS OF *Pterodroma axillaris*

Although many birds had been handled while banding, and during examination of burrows, few were measured before the 1991 season. The standard dimensions of birds measured during 1991, and those examined by C. M. Miskelly in 1983 are presented in Table 2.

TABLE 2 - Measurements (mm) of adult Chatham Petrels.

	Male (<i>n</i> = 18)	Female (<i>n</i> = 11)	Sex unknown
	Mean \pm SE Range	Mean \pm SE Range	Mean (<i>n</i>) Range
Bill length	24.5 \pm 0.2 23.0-26.7	24.3 \pm 0.21 23.2-25.3	24.4 (18) 23.5-25.4
Bill depth	11.5 \pm 0.06 11.1-12.0	11.5 \pm 0.09 11.1-12.1	11.2 (17) 10.8-11.6
Tarsus	31.6 \pm 0.28 29.8-33.5	31.7 \pm 0.32 30.1-33.5	31.2 (18) 30.0-32.0
Mid-toe + claw	39.4 \pm 0.23 37.8-41.3	38.6 \pm 0.25 37.7-39.9	40.0 (17) 37.3-43.5
Wing length	216 \pm 0.84 212-228	219 \pm 1.25 212-228	218.8 (17) 213-224
Tail length	95 \pm 0.64 91-102	97 \pm 1.06 92-105.4	94.5 (17) 90-100.4

DISCUSSION

From the paucity of records of the species, even on its known breeding grounds, revealed by the early records and more recent surveys, it is obvious that the Chatham Petrel is very rare. The rarity of burrows occupied by Chatham Petrels, and the apparent low breeding success revealed by the recent studies suggest that it may also be endangered.

That the decline is continuing may be inferred from changes in the distribution of burrows and breeding birds. The main flight calls of Chatham Petrel are similar to but slower and softer than those of the Black-winged Petrel (pers. obs.). Recordings have now been made of Chatham Petrel calls and these have been given to Les McPherson for his collection. In the past, observers have heard Chatham Petrel calls in the Woolshed Bush area and around the present hut site but very few calls have been heard there between 1988 and 1991. By 1990 the most calls heard were from birds near or over the upper Kokopu Creek area. This was subsequently shown to be where the main aggregation of known burrows lies.

Fleming (1938) noted the remains of Chatham Petrels in skua middens in 1937 and Scarlett found some in middens in 1967. Today, it is possible to find Black-winged Petrel remains but there are no recent reports of Chatham Petrels from skua middens. The great increase in vegetation cover that has occurred since 1937 (nearly all the pastures have become dense 2-3 m-high thickets of mainly vines, bracken, blackberry, and emergent trees) will have made Chatham Petrels largely inaccessible to skuas. In fact skuas have not been seen near any of the burrows. Predation is probably not a factor in the seemingly low numbers.

The present precarious situation may result from a number of causes. Broad-billed Prions (*Pachyptila vittata*) have been seen to fight with incubating Chatham Petrels (D.V. Merton, M.J. Imber, pers. comm.). The

petrels have subsequently deserted their egg. Prions have also been present in Chatham Petrel burrows early in the season and have used the burrows for their own breeding. At the time this competition for breeding sites was observed, its extent had not been measured and so it was uncertain just how much it threatened the future of the species.

By the end of the 1991 field season, in mid-February, it was clear that non-breeding birds were still active over the colony areas. The activity continued as the Broad-billed Prions returned from their moult and their only time of total absence from the island. Further investigation is needed to monitor interaction between the two species from mid-February and during the time of late chick rearing. (Work done in the 1991/92 breeding season has addressed this). There are no data yet to indicate the exact period of absence of Chatham Petrels from South East Island or confirmation of their destination during such an absence.

Seabirds in general are faithful partners and other species of *Pterodroma* are known to have high rates of partner and burrow fidelity (M. J. Imber, pers. comm., 1974, Warham *et al.* 1977). The fates of five burrows of Chatham Petrels have been followed for at least three seasons, and only two of these held the same pair of birds in 1991 and in 1989/90. The other three contained one of the original pair, almost certainly the male (he is more likely to be faithful to the burrow). It cannot be determined from such a small sample whether the apparently high rate of pair bond disruption is normal for *P. axillaris* or whether it was caused by factors such as handling by humans or competition for burrows.

Now, low breeding success rate in the 1990/91 season and confirmation of prions in study burrows in the early part of the 1991/92 breeding season suggests that the problem is serious. In 1991, from 16 eggs there were only 2 chicks alive a month before fledging. It has yet to be determined what factors are operating to produce such a low breeding success.

After three consecutive seasons of study, some valuable data have been collected but it is still not possible to define the conservation status of the species. It seems reasonable to assume however, that this population is declining and that the breeding area has and is contracting from its former extent. The species is not known to breed now on any of the other islands on which fossil remains have been found. The habitat on South East Island is still changing and that, and competition for burrows, will continue to be causes for concern.

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Note added in press: Since this was written, a further two seasons of research have produced information to fill a number of gaps in the knowledge of this species. These data will be published elsewhere by the workers involved.